HIGHLY PATHOGENIC AVIAN INFLUENZA

Multi-Disciplinary and Collaborative Research to Minimise the Impacts on the Poor

The emergence of Highly Pathogenic Avian Influenza (HPAI) and the threat of a global human pandemic have been issues of great concern to the international community in recent years. The problem is compounded by uncertainty regarding the timing, extent and severity of HPAI, and the risk of human infection.

The global response has been extensive, with billions of dollars pledged (and diverted from other uses) for efforts to control and prevent the influenza. Even though HPAI is a global phenomenon, developing countries in Africa and Asia have had the most difficulty containing the disease. Between 2003 and 2008, 47 countries had reported HPAI in their domestic poultry. Those currently considered endemic are Egypt, Indonesia and Nigeria, while others such as Bangladesh, China, Thailand and Vietnam have had repeated outbreaks. Eight countries have reported human cases, and all but one of those have reported human fatalities.

In addition to actual outbreaks, control and prevention strategies have significant associated economic and social costs, including the direct costs of standard disease control measures – such as compensation, vaccination, eradication and bio-security – as well as the indirect costs of building institutions and mechanisms to support those measures. Significant indirect costs also stem from wide-spread market shocks, which place a heavy burden not only on poultry producers of all sizes, input suppliers, and others along the poultry value chain, but also on consumers. Therefore, when designing effective, cost-efficient strategies to control and prevent the disease, both direct and indirect costs must be weighed against direct and indirect benefits.

In many affected countries, poultry production is highly heterogeneous; hence, the effectiveness and efficiency of control and prevention strategies are likely to vary significantly across production units depending on their size and levels of bio-security. Policy makers are therefore questioning whether any one strategy will really work in any given country. In many developing countries, a great majority of the rural and peri-urban poor are involved

in small-scale or backyard poultry production, typically characterised by low levels of bio-security. Small-scale producers depend on poultry for their livelihoods, food security and nutritional needs. Often poultry constitute a quick and high-return investment opportunity for breaking out of the poverty trap.

In several developing countries affected by HPAI, it is the small-holders who bear the bulk of the burden of the costs of HPAI outbreaks, even though the costs per household may be negligible due to the small size of flocks compared with larger producers. This nuance makes it difficult for decision makers to determine how best to implement control and prevention strategies, particularly when poor households may be unable or unwilling to make changes in their management practices without financial and technical assistance. Therefore, in addition to the issues of efficiency and efficacy, the impact on the poor should also be considered to ensure that the design of HPAI control and prevention strategies is pro-poor. It is difficult, however, to focus on pro-poor control strategies under emergency conditions.

Another issue that has been so far overlooked is the interactions among different types of production systems, which may further modulate the spread of the disease. Furthermore, most HPAI control and prevention strategies to date have focused on controlling the disease when it is in the acute stage. For some developing countries, however, HPAI is now endemic, which poses different challenges for its control. Moreover, in the event of an incursion, endemicity has to be considered as a possible scenario for many developing countries due to geography, infrastructure and capacity.

While many policy makers recognise that they must act rapidly to control HPAI, no clear consensus exists as to the best way to proceed. Despite significant scientific advances made towards understanding HPAI in the recent past, important knowledge gaps remain, pertaining to disease ecology and epidemiology, the economic impact of HPAI and its control, and the institutional arrangements most suited for disease control in different production systems and socio-economic settings. These gaps exist as a result of a variety of factors:

- **Lack of an integrated approach to investigate how HPAI spreads and how it can be prevented and controlled:** The outbreak and spread of HPAI is not just a veterinary challenge but a problem that cuts across social, economic, cultural and political arenas. Indeed, control and prevention strategies are likely to be unsuccessful without an understanding of the economic and social impacts of different control measures on different sized producers. Correspondingly, successful efforts to identify cost-effective, efficient and socially-equitable control strategies require multi-disciplinary efforts. and consultation with multiple actors.
- **Lack of specific focus on the impact of HPAI outbreaks and control and prevention strategies on the poor:** Even though small-scale and backyard poultry producers bear much of the cost of disease outbreaks, as well as the costs of control and prevention strategies, little research quantifies these costs or investigates strategies to minimise them.
- **Lack of understanding of appropriate institutions and incentives in support of efficient and effective HPAI control and prevention:** Identification of best practices in terms of efficient, effective and equitable institutions and the 'right' economic incentives is crucial for successful HPAI prevention and control.
- **Lack of effective risk communication and advocacy:** If HPAI control and prevention are to be both effective and pro-poor, it is vital that policy makers and planners at all levels have access to up-to-date information based on sound analysis, and that they are facilitated to use it. This requires effective communication and advocacy, something that has suffered from the emergency conditions under which disease control measures have so far been implemented.

Specific questions that have not been fully answered by existing research include the following:

- The role played by wild migratory birds in medium- to long-distance disease spread, as well as the importance of wild waterfowl as reservoir of HPAI H5N1 remain debated. These issues have particular relevance for the planning of surveillance and early response.
- The relative risks of HPAI genesis and spread in small-scale, backyard operations vis-à-vis larger, more intensive units are contested. These risks need to be more precisely defined and balanced against the role of poultry in economic growth, livelihoods support and household food security when making decisions about the structure of the poultry sector.
- Bio-security measures that can be cost-effectively applied in small-scale and backyard production systems and poultry markets have not been evaluated and documented.
- The main pathways for human infection are still unknown and need to be resolved in order to clarify advice on safe poultry production and handling.
- The role of vaccination as a component of risk reduction needs more careful evaluation across the different species of poultry and within the main poultry production systems.
- The long-term fiscal burden of disease risk management needs to be reduced by finding incentives for private investment in improved animal health.
- The extent of increased demands on the capacity,

Box 1. Project countries and their poultry outbreaks and confirmed human cases of HPAI, 2004–07

Country	Outbreaks in poultry	Reported and confirmed human cases
Cambodia	20	7 cases/7deaths
Ghana	6	–
Indonesia	261	115 cases/93 deaths
Nigeria	60	1 case/1 death
Thailand	1,137	25 cases/17 deaths
Vietnam	2,424	100 cases/46 deaths

Sources: Data on poultry outbreaks are from http://www.oie.int/downld/AVIAN%20INFLUENZA/Graph%20HPAI/graphs%20HPAI%2017_12_2007.pdf; data on human cases are from http://www.who.int/csr/disease/avian_influenza/country/cases_table_2007_12_18/en/index.html.
Note: Specifically, data span from 2004 until December 17, 2007.

management and funding of animal health systems resulting from the implementation and promotion of control and prevention measures – determined as the above questions are answered – has yet to be defined.

In short, in order to be able to design effective, efficient and socially equitable strategies to control and prevent HPAI outbreaks, decision makers require easily accessible information on (i) cost effectiveness of various control and prevention strategies (or combinations thereof); (ii) critical control points for mitigating identified risks given the various spread mechanisms; (iii) economic and livelihood impacts of different control and prevention strategies; (iv) distribution of these costs and benefits across different segments of the society; and (v) necessary incentives and institutional arrangements.

The United Kingdom's **Department for International Development (DFID)** has funded a collaborative action-oriented and multi-disciplinary research project on HPAI control and prevention strategies. **The purpose of this project is to aid decision makers in developing pro-poor HPAI control and prevention strategies that are not only cost-effective and efficient, but also livelihood enhancing, particularly for the rural poor in developing countries.** It is expected that the project will inform the agenda for national and international action by challenging conventional wisdom through evidence-based research founded on constructive dialogues among scientists, policy makers, industry and farmers.

The project will be implemented in a number of Asian and African countries that have recently experienced HPAI outbreaks, including Cambodia, Ghana, Indonesia, Nigeria, Thailand and Vietnam. Investigations will also be carried out in Ethiopia and Kenya, countries in which there has been no outbreak of disease (Box 1).

In line with the participatory and collaborative nature of this project, **national partners in study countries will collaborate with an international research consortium** comprising risk analysts, veterinarians and social and economic scientists from five organisations (Box 2).

The project aims to address existing knowledge gaps, as well as urgent needs that may emerge during the project's life, by drawing together existing information and supplementing it. **Emphasis will be given to key priority issues within each project country depending on the current situation and needs.** The main areas of work will be the following:

- What are the pathways by which HPAI can spread to poultry in each study country, and what is the likelihood that it will spread by each identified pathway?
- Where are the critical control points for mitigation of HPAI risk in each study country, given the over-arching objective of averting a global human pandemic?
- What is the epidemiological impact of various control and prevention strategies in each study country, and what are the economic costs and benefits associated with each strategy at each identified control point?
- How are the costs and benefits of various control and prevention strategies distributed among different segments of the population in each study country, with particular emphasis on the poor?
- What are the cost-effective control strategies or bio-security measures that are most likely to be

Box 2. International research consortium

Institution	Role in the project and institutional expertise
International Food Policy Research Institute	Economic and livelihood analysis, institutional and policy analysis, risk analysis and communications
International Livestock Research Institute	Epidemiology and risk analysis, economic and livelihood analysis and institutional analysis
Food and Agriculture Organization of the United Nations	Communication, advocacy and capacity building; economic and livelihood analysis and pro-poor policy development
Royal Veterinary College, University of London	Epidemiology and risk analysis
University of California, Berkeley	Economic and institutional analysis

implemented (i.e. adopted) by the poor in each study country?
- What are the institutions and incentive mechanisms that would enable or impede adoption of control and prevention strategies that are both effective and pro-poor in each study country, and how can these be facilitated by interaction with international institutions?
- What type of decision and communication processes need to be in place in each country to ensure that research findings are incorporated into the policies and plans for HPAI control and prevention?
- What are the similarities and differences among various control and prevention strategies, and institutions and incentive mechanisms for different countries depending on their epidemiological and economic situation?

Project teams will locate or collect various types of data from study countries and will employ novel methodologies from several disciplines, including institutional and experimental economics, economic valuation, livelihoods analysis, cost–benefit and cost-effectiveness analyses, risk analysis, and mathematical modelling, to name a few. All these methodologies will be applied in a cohesive framework to gain complementarities between them based on uniformity of baselines and assumptions so that policy makers can have consistent policy recommendations. Further, the project teams will work with the policy makers to understand how to interpret the various types of findings given policy makers' specific objectives.

The results of this project will assist decision makers in three specific, and interacting, ways:
1. by distinguishing between the short-term and long-term impacts (economic and epidemiological) of the disease in acute and endemic scenarios;
2. by assessing the distributional impacts on various categories of stakeholders, especially the poor;
3. by providing them with proposals for cost-effective prevention and control strategies and the necessary institutions and incentive mechanisms that need to be put in place to enable their adoption; and
4. by capturing the effects of alternative policies based on both the local and the long-distance spread of HPAI.

A list of expected research outputs are provided in Box 3.

As well as generating information to close knowledge gaps in the area of pro-poor HPAI control and prevention strategies, the project strongly emphasises the capacity building of national decision makers in the project countries to interpret risk, economic, livelihood and institutional analyses. It also prioritises prompt and accessible communication of the findings to decision makers. Successful advocacy is expected to ensure the development and implementation of efficient, effective and socially-equitable HPAI control and prevention strategies and, ultimately, to reduce the risk of a human pandemic through sustainable control of disease at its source in poultry.

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Box 3. Expected action-oriented research outputs

- Socio-economic, spatial and temporal distributional impacts of potential and actual HPAI outbreaks are identified and quantified.
- Critical control points to reduce risk are identified to maximise the impact of interventions.
- Cost-effective, efficient and equitable control and prevention strategies are identified and compared.
- Economic incentives and institutions appropriate to national circumstances are identified for efficient, effective and equitable HPAI control and prevention.
- Insights from national and regional experiences are compared so as to derive national and international lessons for efficient, effective and equitable HPAI prevention and control.
- All of the above areas are developed and shared with policy and decision makers at various levels in project countries to strengthen their animal health plans and planning capacity.

All photos are provided compliments of ILRI/Mann 2005.

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